DOCUMENT RESUME

ED 427 017 TM 029 354

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TITLE Learning How They Learn: A Review of the Literature on Learning Styles.
PUB DATE 1998-00-00
NOTE 14p.
PUB TYPE Information Analyses (070)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Style; Learning Modalities; *Learning Strategies; Literature Reviews; *Personality Traits; Teaching Methods
IDENTIFIERS Gregorc Style Delineator; Myers Briggs Type Indicator; Witkin (H A)

ABSTRACT

The literature on learning styles is full of unresolved issues, both theoretical and practical. Early research into learning styles includes that of H. A. Witkin, who developed the Embedded Figures Test in the late 1960s. This test determines the "field dependence" or "field independence" of individuals, marking their global (field dependent) or analytic (field independent) orientations. A. F. Gregorc developed four learning preference modes based on dualities in the acquisition of learning: abstract versus concrete and sequential versus random. Another conceptualization of learning styles is that of the Myers-Briggs Type Indicator, based on the theory of Carl Jung, which divides individuals into 16 archetypes. R. and K. Dunn have been promoting learning styles-based instruction for more than 20 years. Their Learning Styles Inventory elicits student reaction to the instructional environment, the student's emotionality, social preferences, and physiological uniqueness. Also noted are the joint research of W. Barbe, M. Milone, and R. Swassing, and the work of J. Keefe. Some criticism of learning styles-based instruction are noted. (Contains 20 references.) (SLD)

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Learning How They Learn:

A Review of the Literature on Learning Styles

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Introduction

Since the 1970s, educational researchers have attempted to explain and categorize the different ways in which people learn and retain information and concepts. "Cognitive styles" or "learning styles" have been defined as "self-consistent, enduring individual differences in cognitive organization and functioning" (Ausubel, Novak, & Hanesian, 1978, p. 203), "cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (Keefe, 1982, p. 44), and "distinctive behaviors which serve as indicators of how a person learns from and adapts to his environment" (Gregorc, 1979, p. 234).

Theoretical frameworks have included categorization of learning styles as field-dependent/global or field-independent/analytic (Ramirez & Castenada, 1974; Witkin, 1976) and concrete-abstract and random-sequential (Gregorc, 1979). Myers and Briggs delineate 16 personality types, with implications for learning. Dunn and Dunn (1979) describe four groups of elements in which learners have distinct preferences: environmental (sound, light, temperature, and design), emotional (motivation, persistence, responsibility, and a need for structure), sociological (working alone, with others, or with an adult), and physical (perceptual strengths, including visual, auditory, tactile, and kinesthetic; intake, time of day, and need for mobility). Barbe and Milone (1981) focus on modality strengths rather than on modality preferences. The National Association of Secondary School Principals promotes a comprehensive learning styles instrument, well grounded in the research of others.

The literature on learning styles teems with unresolved issues, both theoretical and practical. What are the best delimiters of learning style? Are individual preferences as important as

individual strengths? Do learning styles change over time? Are "at-risk" students well served with learning styles-based teaching? What are the implications of learning styles-based teaching on diverse cultural groups? Should learning styles of teachers and learners be matched? Should teachers address the learning style of each individual student or provide a variety of techniques that address the styles of groups of students? This paper will provide insight from the literature on each of these issues.

Herman A. Witkin

Witkin's Embedded Figures Test, developed in the late 1960s, requires individuals to find a simple figure within a complex design; responses determine "field dependence" or "field independence." In general, those who are field dependent or "global" perceive things as a whole, make broad general distinctions among concepts, are people-oriented, and learn material in a social context. Those who are field independent or "analytic" perceive things in parts rather than as a whole, impose structure or restrictions on information and concepts, see little overlap, and have an impersonal relationship to the world (Guild & Garger, 1985).

Field-independent students are often found to perform better in school (Cohen, 1968, 1969; Cross, 1977) and on standardized measures of academic ability (Renninger & Snyder, 1983). Students whose styles are matched with those of their teachers report greater ease of learning (Packer and Bain, 1978) and higher satisfaction (Renninger & Snyder, 1983) than those whose styles are mismatched.

Ramirez and Castaneda (1974) believe that learning styles are created by cultural differences as well as by individual tendency to be global or analytic. They favor both matching

and mismatching teachers and learners in order to encourage "bicognitive ability," the ability to use both styles effectively.

Anthony F. Gregorc

Gregorc, fascinated with the concept of duality throughout Western philosophy, religion, and psychology, discerned two sets of dualities in the acquisition of information: abstract vs. concrete and sequential vs. random. The two sets of dualities result in the following four learning preference modes (Gregorc, 1977):

The abstract sequential learner. The abstract sequential learner is easily able to decode written, verbal, and image symbols. Symbols and pictures are important to this learner, as are presentations that are rational, substantive, and well-organized.

The abstract random learner. The abstract random learner is skilled in sensing and interpreting atmosphere and mood. For this learner, the medium is associated with the message, and a speaker's manner, delivery, and personality are as important as what is spoken. Information is gathered in an unstructured manner, reflected upon, and then organized into a pattern that makes sense to the learner.

The concrete sequential learner. The concrete sequential learner prefers hands-on experiences that use all five senses. This learner prefers step-by-step directions and well-ordered presentations and will defer to authority and guidance in the learning environment.

The concrete random learner. The concrete random learner likes to experiment, comes to the crux of the matter quickly, and uses intuition in drawing conclusions. This learner prefers a trial-and-error approach to gathering information and does not welcome teacher intervention.

Gregorc (1979) believes that although both major and minor learning styles emerge from

innate predispositions, students can and should develop other styles, particularly those in which they have a minor proclivity. He feels that the most successful students in a classroom are those whose learning styles match the style of the teacher (Gregorc, 1977). In a study of learning styles of community college students, O'Brien and Thompson (1994) found this to be true only for concrete random students.

Gregorc (1979) believes that teachers who are able to match their learning style and teaching style (e.g., an abstract random providing a stimulus-rich, unstructured learning environment) are most comfortable. He cautions, however, that "too much matching can...lead to boredom" (p. 26). On the other hand, long periods of mismatch may lead to major emotional and physical problems.

Because diagnostic instruments focus on few dimensions and because students may lie on tests or report their adaptive behavior rather than their natural preferences, Gregorc (1979) advises against using them as sole arbiters of instructional planning. Rather, teachers must use their own intuition and judgment in conjunction with diagnostic data to guide student learning. According to Gregorc (cited in O'Neil, 1990), attempting to teach to all students' styles can quickly cause a teacher to burn out. Team teaching by teachers of different styles is the best way to address styles-based instruction.

Myers & Briggs

The Myers-Briggs Type Indicator (MBTI), based on the theory of Carl Jung, divides individuals into 16 archetypes based on the way they view their environment (Sensing vs. Intuition), make decisions (Thinking vs. Feeling), focus on the inner world of ideas and concepts or the outer world of people and things (Introvert vs. Extrovert), and respond to situations with

acceptance or a judgmental attitude (Perception vs. Judgment). The sixteen four-letter types are as follows (Myers, 1987):

ISTJ Serious, quiet, earning success by concentration and thoughtfulness

ISFJ Quiet, friendly, responsible, and conscientious

ISTP Cool onlookers, quiet, reserved, observing life with detached curiosity and humor

ISFP Retiring, quietly friendly, sensitive, kind, and modest

INFJ Succeeding by perseverance, originality, and desire to do what is needed

INTJ Original mind, great drive for own ideas and purpose, independent, and determined

INFP Full of enthusiasm and loyalty; often absorbed in own projects

INTP Quiet, reserved, enjoys theoretical pursuits and problem solving

ESTP Adaptable, tolerant, conservative, good at problem solving

ESFP Outgoing, easygoing, accepting, friendly, likes making things happen

ESTJ Practical, realistic, like business or mechanics

ESFJ Warm hearted, talkative, popular, conscientious, and active

ENFP Warm, enthusiastic, high-spirited, ingenious, and imaginative

ENTP Quick, ingenious, alert, and outspoken

ENFJ Responsive, considerate of others, and sociable

ENTJ Decisive, confident, well-informed, and frank; possesses leadership ability

The Myers-Briggs Type Indicator, in use for more than 50 years, is used primarily in psychology and human resources management. Because the instrument is intended for use by adults, most educational research involving the MBTI focuses on teacher and pre-service teacher behavior. According to O'Neil (1990), instruments based on personality theory, such as the MBTI, reflect

differences in cognitive, affective, and environmental functioning and are thus consistent with learning styles theory.

Rita and Kenneth Dunn

The Dunns have been actively promoting learning styles-bases instruction for more than 20 years. Their Learning Style Inventory, the most widely used learning styles instrument in elementary and secondary schools (Keefe, 1982), elicits students reaction in four areas:

1. The immediate instructional environment: sound, light, temperature, and seating design.

2. Each person's emotionality: motivation, persistence, responsibility (conformity vs. nonconformity), and structure (internal vs. external).

3. Social preferences: learning alone, in a pair, with peers, in a small team, or with an adult.

4. Physiological uniqueness: perceptual preferences (auditory, visual, tactile, kinesthetic), intake (eating, drinking, chewing, biting), time-of-day energy highs and lows, and mobility vs. passitivity needs (Dunn, 1993).

Dunn and Dunn (1979) strongly believe that both achievement and motivation improve when learning and teaching styles are matched. Teachers teach not as they were taught but as they learned, often feeling that there is only one right way to learn and hence only one right way to teach. Modification of teaching style is difficult but can be achieved if the teacher understands why one style cannot effectively reach all students. Elements of teaching style that can be adapted to student preference include: instructional planning, student groupings, room design, teaching environment, teaching characteristics, teaching methods, and evaluation techniques.

The strength of Rita Dunn's conviction is carried in this quote:

> *If* individuals have significantly different learning styles--as they appear to have--is is not unprofessional, irresponsible, and immoral to teach all students the same lesson in the same way *without* identifying their unique strengths and then providing responsive instruction? (Dunn, 1993, p. 30)

Jalali (1989) used the Learning Style Inventory to study learning styles differences among African-American, Mexican-American, Chinese-American, and Greek-American elementary students. Among the findings were: African-American students worked better with peers than by themselves, were far more likely than the Chinese-Americans to prefer routines and highly structured situations, and learned best by listening; there were more similarities than differences between the African-Americans and the Greek-Americans and between the Mexican-Americans and the Greek-Americans; and only Chinese-American students performed best in the early morning. In responding to this study, Dunn (1993) comments: "Children of all cultural groups tend to be more motivated that their teachers might suspect; they merely *cannot* achieve when they are taught through strategies disparate with *how* they learn" (p. 27). She also cautions against over generalization, pointing out that individuals in each ethnic group learned in other groups' majority styles.

Helene Hodges (cited in O'Neil, 1990) fears that categorizing ethnic groups in terms of learning style preferences "smacks of racism and discrimination" (p. 8). O'Neil counters that this concern is grounded in the mistaken belief that some styles are more valuable than others.

The Dunns (cited in O'Neil, 1990) believe that "at-risk" students have the most to gain from learning styles-based instruction. According to Rita Dunn, classroom design and rules that

prevent students from moving freely are responsible for "problem student" behavior. Others agree. Harvey Silver (cited in O'Neil, 1990, p. 5) says students "learn best through direct actual experience, cooperation and collaboration, and high levels of interaction."A system that promotes competition and individual work precludes optimum learning.

Walter Barbe, Michael Milone, and Raymond Swassing

Barbe, Milone, and Swassing believe that observable "modality strengths," the superior functioning of visual, auditory, and kinesthetic channels of learning, are more important in planning instruction than learners' modality preferences, which may or may not match their strengths.

Their research, completed in the late 1970s, showed that students vary in respect to their modality strengths, with about 30% visual, 30% mixed, 25% auditory, and 15% kinesthetic. They believe that modality strength is not fixed but shifts as the student ages. Primary grade children are most often auditory, shifting to visual and kinesthetic in the late elementary years, then moving to visual and auditory in adulthood; modalities also become more integrated with age. They found no difference between the races or sexes on modality strength.

Barbe, Milone, and Swassing found evidence to support the argument that matching students with teachers of similar modality strengths results in higher performance achievement. They advocate using data on student modality strength in instructional planning, including selection of media and materials and design of the physical plant. They feel that both teachers and supervisors should be aware of their own modality strengths, realizing that their own proclivities may affect their perceptions and behavior.

James Keefe

As Director of Research for the National Association of Secondary School Principals (NASSP), Keefe (1990) coordinated the development of a learning style paradigm and an instrument for measuring learning styles based on personality theory as well as previous research on information processing and aptitude-treatment interaction. The result is a "General Operations Model" in which learning style is defined as "information processing, that is, the storage and retrieval of information" (p. 59) and is the "gestalt" of the cognitive, affective, and environmental preferences that the learner brings to the task. Elements of the Embedded Figures Test (cognitive), the Edmonds Learning Style Identification Exercise (affective), and Dunn and Dunn's Learning Style Inventory (environment) were combined to form the Learning Style Profile. Exploratory and confirmatory factor analysis revealed eight cognitive or information processing elements (spatial, analytic, sequential processing, memory, simultaneous processing, discrimination, and verbal-spatial), six study preferences (mobility, posture, persistence, sound, afternoon study time, and lighting), three perceptual responses (visual, emotive, and auditory), and six instructional preferences (early morning time, late morning time, verbal risk, manipulative, grouping, and temperature).

The Critics

Some researchers are unconvinced that learning styles-based instruction can improve motivation and performance. According to Kavale and Forness, "Although the notion of modality-based instruction remains intuitively appealing, the evidence is not supportive." "Mostly advocates do the [research] work," admits James Keefe. And Gregorc adds, "I think a lot of it is suspect. My contention is that one of the reasons that some of these scores are going up...is that

the kids sense that someone cares..." (cited in O'Neil, 1990, p. 7).

Conclusion

Learning styles-based instruction *is* intuitively appealing, no doubt the reason for its longevity. In a profession that promotes a "Technique of the Week," the notion of teaching in different ways to different students has been around as long as there have been exemplary teachers. The question, therefore, is not "Should we teach students in different ways?" but rather, "Which differences should we address?" Awareness of learning styles and skill in utilization of instructional methods for addressing those styles will give teachers a wide array of techniques to use in promoting student learning. The best teachers will employ a variety of instructional techniques, judging success not by the impressiveness of their pedagogical skills but by the performance and attitudes of their students.

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